Docket No. AB-131U

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Cliams:

1. (currently amended) A fully implantable tissue stimulation prosthesis comprising:

an implantable hermetically sealed case;

an implantable microphone;

an active electrode array external to the hermetically sealed case, comprising at least one electrode group and associated switching circuitry, wherein the at least one electrode group includes a plurality of individual electrodes that may be individually activated by electrode control signals applied to the switching circuitry;

a battery carried within said sealed case;

electronic circuitry housed within said sealed case for receiving and processing signals from said microphone, for generating the electrode control signals, and for generating stimulation currents, and for applying the electrode control signals and stimulating currents to the active electrode array through feed-through connectors, wherein the stimulation currents [~~that~~] are applied through selected groupings of the plurality of individual electrodes.

2. (currently amended) The prosthesis as set forth in Claim 1 further including a connector through which said active electrode array is detachably connected to the electronic circuitry in said hermetically sealed [~~in said sealed~~] case.

3. (original) The prosthesis as set forth in Claim 2 wherein the plurality of individual electrodes included within the at least one electrode group comprises at least one lateral electrode contact and at least one medial electrode contact.

4. (original) The prosthesis as set forth in Claim 3 wherein the lateral and medial electrode contacts electrically connect with the switching circuitry, and wherein the switching circuitry responds to the electrode control signals to selectively activate one or both of the medial or lateral electrode contacts.

5. (original) The prosthesis as set forth in Claim 4 wherein the switching circuitry and lateral and medial electrode contacts are formed on a silicon die, and wherein a plurality of said silicon dies are stacked and over-molded with silastic to form the active electrode array.

6. (original) The prosthesis as set forth in Claim 5 wherein the switching circuitry included within the active electrode array is adapted to operate at a low compliance voltage, thereby reducing power consumption.

7. (original) The prosthesis as set forth in Claim 1 wherein the electronic circuitry housed within the sealed case includes both analog and digital circuitry.

8. (original) The prosthesis as set forth in Claim 1 further including an RF coil for receiving and sending RF signals to and from the electronic circuitry housed within the sealed case.

9. (original) The prosthesis as set forth in Claim 8 wherein RF signals received through the RF coil provide operating power to recharge the battery housed within the sealed case.

10. (currently amended) The prosthesis as set forth in Claim 9 wherein the active electrode array is adapted for insertion into a human cochlea, and wherein the stimulation currents [~~applied through selected groupings of the plurality of individual electrodes~~] are applied through selected electrode groupings as controlled by the electrode control signals and the switching circuitry of the active electrode array in order to provide the sensation of hearing for a user of the prosthesis.

11. (original) The prosthesis as set forth in Claim 10 further including means for adjusting operating parameters of the electronic circuitry through the use of acoustic remote control signals received through the microphone.

12. (original) The prosthesis as set forth in Claim 11 wherein the acoustic control signals comprise phase-shift keyed (PSK) modulation of an acoustic signal within a narrow frequency band.

13. (original) The prosthesis as set forth in Claim 12 wherein the narrow frequency band is centered at about 6KHz.

14. (original) The prosthesis as set forth in Claim 1 wherein the electronic circuitry further includes means for determining a simultaneous N-of-M strategy to be applied by the prosthesis.

15. (original) The prosthesis as set forth in Claim 1 wherein the electronic circuitry further includes a plurality of pulse generator circuits and means for defining a pulse table that drives the pulse generator circuits.

16. (currently amended) An implantable tissue stimulation prosthesis comprising:

an implantable hermetically sealed case;

an active electrode array external to the hermetically sealed case, comprising a plurality of active electrodes, wherein each active electrode includes switching circuitry and a plurality of individual electrode contacts that may be individually activated by electrode control signals applied to the switching circuitry;

a battery carried within said sealed case; and

electronic circuitry housed within said sealed case, said electronic circuitry including telemetry circuitry that receives programming signals from an external source, said electronic circuitry further including circuitry that generates the electrode control signals and that applies the electrode control signals to the switching circuitry of the active electrode array, and that further generates stimulation currents that are applied through selected ones of the plurality of individual electrodes of the active electrode array.

17. (original) The implantable tissue stimulation prosthesis of Claim 16 wherein the active electrode array comprises at least four active electrodes.

18. (currently amended) The implantable tissue stimulation prosthesis of Claim 17 wherein the plurality of individual electrode contacts ~~electrodes~~ included within each active electrode comprises at least one lateral electrode contact and at least one medial electrode contact.

19. (original) The implantable tissue stimulation prosthesis of Claim 18 wherein the switching circuitry of each active electrode comprises decoding circuitry, a first switch coupled to the decoding circuitry and the at least one lateral electrode contact, and a second switch coupled to the decoding circuitry and the at least one medial electrode contact, wherein the decoding circuitry responds to the electrode control signals and causes the first and second switches to selectively activate one or both of the medial or lateral electrode contacts.

20. (original) The implantable tissue stimulation prosthesis of Claim 19 wherein the decoding circuitry and first and second switches of an active electrode are formed on a suitable substrate die, and wherein the medial and lateral electrode contacts of the active electrode are formed on opposing edges of the substrate die, and wherein at least four of said substrate dies are stacked and over-molded with silastic to form the active electrode array.

21. (original) The implantable tissue stimulation prosthesis of Claim 20 wherein the active electrode array comprises a plurality of active electrode banks, wherein each active electrode bank includes a plurality of active electrodes,

22. (original) The implantable tissue stimulation prosthesis of Claim 21 wherein at least one active electrode in each active electrode bank includes a built-in strain gauge, wherein the strain gauge is adapted to measure stress across the substrate die.

23. (withdrawn) An active electrode array for use with an implantable neural stimulator, wherein the active electrode array comprises at least four banks of active electrodes, wherein each bank of active electrodes includes a plurality of active electrodes, wherein each active electrode comprises a plurality of individual electrode contacts and circuit means adjacent the individual electrode contacts for individually activating the plurality of individual electrode contacts with a selected electrode stimulation current in response to electrode control signals.

24. (withdrawn) The active electrode array as set forth in Claim 23 wherein the plurality of individual electrodes included within each active electrode comprises at least one lateral electrode contact and at least one medial electrode contact.

25. (withdrawn) The active electrode array as set forth in Claim 24 wherein each active electrode includes a silicon die and switching circuitry hermetically sealed on the silicon die and operatively connected to the lateral and medial electrode contacts, wherein the switching circuitry responds to the electrode control signals to selectively activate one or both of the medial or lateral electrode contacts.

26. (withdrawn) The active electrode array as set forth in Claim 25 wherein each bank of the active electrodes comprises a stack of the silicon dies of each active electrode belonging to that bank, over-molded with silastic.

27. (original) A fully implantable cochlear prosthesis comprising:

an implantable hermetically sealed case wherein is housed:

electronic circuitry;

a battery;

a microphone;

wherein the battery provides operating power for the electronic circuitry and the microphone is operatively connected to the electronic circuitry;

an active electrode array connected to the electronic circuitry within the sealed case, wherein the active electrode array includes a programmable number of electrode contacts through which stimulation current may be selectively delivered to surrounding tissue; and

a connector that allows the active electrode array to be detachably connected with the electronic circuitry within the sealed case;

wherein the active electrode array includes active switching elements and a multiplicity of both medial and lateral electrode contacts, any one of which may be selected to apply a stimulation current through the active switching elements included within the array.

28. (original) The fully implantable cochlear prosthesis of Claim 27 wherein the active switching elements included within the active electrode array are adapted to operate at a low compliance voltage, thereby reducing power consumption.

29. (original) The fully implantable cochlear prosthesis of Claim 28 wherein the battery is rechargeable, and wherein the electronic circuitry included within the sealed case includes recharging circuitry that receives power from an external source for recharging the battery.

30. (original) The fully implantable cochlear prosthesis of Claim 27 wherein the electronic circuitry housed within the hermetically sealed case includes programmable circuitry that is adapted to be reprogrammed using externally generated programming signals.

31. (original) The fully implantable cochlear prosthesis of Claim 30 wherein the programming signals are selected from the group comprising acoustic and RF signals.

32. (original) The fully implantable cochlear prosthesis of Claim 31 wherein the programming signals comprise an acoustic signal that is phase-shift keyed (PSK) modulated within a frequency band centered at about 6KHz.